

ONCOLOGY

❑ Cancer

- Cancer is a disease of the cell in which the normal mechanism of control of growth and proliferation are disturbed, which results in distinct morphological alterations of the cell and aberrations of tissue patterns.
- Abnormal mass of tissue, the growth of which exceeds and is uncoordinated with that of the normal tissues and persists in the same manner after the cessation of stimuli which evoked the change.
- ▶ Benign tumour?
 - . Tumour which is confined to one area.
 - . Mortality low
- ▶ Malignant tumour?
 - .Not confined to one area generally spread from one area to another through lymphatic system

Etiology of cancer

1) Ionizing radiations

Atomic bombs and nuclear accidents

X-rays

UV irradiation (sunlight)

2) Inhaled or ingested carcinogens

Atmospheric pollution with polycyclic hydrocarbons

Cigarette smoking

Tobacco

Certain viruses

Family history

Lack of physical Activity

Asbestos

Classification

1) Based on tissue affected:-

.EPITHELIAL

1) Benign

.papilloma

.adenoma

2)Malignant

.carcinoma

CONNECTIVE TISSUE:-

1)Benign

.name of organ + suffix “oma”

eg. neuroma (neuron+oma)

2)malignant

.name of organ + suffix “sarcoma”

eg. Osteosarcoma

Anatomical classification

- ▶ The American Joint Committee on Cancer (AJCC) developed this system –TNM classification
- ▶
- ▶ It has replaced many of the older staging systems.
- ▶ In the TNM system, each cancer is assigned a T, N, and M category
- ▶ T-extent of the tumor
- ▶ N-extent of spread to lymph nodes
- ▶ M-presence of metastasis

Primary tumor(T)

- TX :- tumor can't be measured.
- T0 :-no evidence of primary tumor

- Tis:- carcinoma in situ (tumor has not spread to surrounding tissue).
- T1, T2 ,T3, T4 Size and /or extent of the primary tumor
- T1 – Tumor < 2cm in diameter
- T2 – Tumor 2-5cm in diameter
- T3 – Tumor > 5cm
- T4 – Tumor of any size with direct extension to chest wall or skin
- T1,T2 and T3 tumor further divided in to

(a) No fixation ,(b) with fixation to
underlying fascia or muscle

Regional lymph nodes(N)

- NX - regional lymph nodes cannot be evaluated

- N0 - No regional lymph node involvement
- N1 – mobile ipsilateral nodes
- N2 – fixed ipsilateral nodes
- N3 – supraclavicular or infraclavicular nodes or edema of arm

Distant metastasis(M)

- MX Distant metastasis cannot be evaluated
- M0 No distant metastasis
- M1 Distant metastasis

STAGE 1 = T1 NO MO

STAGE 2 = T2 N1 MO

STAGE 3 = T3 N2 MO

STAGE 4 = T4 N2 M1

Common sites

- ▶ Head & neck .
- ▶ Breast
- ▶ Lung
- ▶ Abdominal organ
- ▶ Uterus
- ▶ Skin
- ▶ Neuro
- ▶ Blood

SIGNS AND SYMPTOMS

- ▶ Unexplained weight loss
- ▶ Chronic fatigue.
- ▶ A lump or thickening in the breast or testicles
- ▶ Change in a wart or mole;
- ▶ Skin sore or a persistent sore throat that does not heal
- ▶ Change in bowel or bladder habits
- ▶ Persistent cough or coughing blood;
- ▶ Constant indigestion or trouble swallowing
- ▶ unusual bleeding or vaginal discharge

Diagnostic tests

The smallest detectable tumor is approx. 1cm in diameter and already contains 1billion cells.

- ❖ Blood counts
- ❖ X-Ray
- ❖ CT Scan
- ❖ MRI
- ❖ PET scan-visualize metabolism of glucose
- ❖ Enzymes
- ❖ USG
- ❖ Isotope scanning

Specific Cancers

- ❖ Breast – Mammogram
- ❖ Rectal –Fecal occult blood test,
Sigmoidoscopy, Barium enema
- ❖ Cervix – pap smear
- ❖ Lung - X-Ray, sputum cytology ,bronchoscopy

Cancer Management

The goal of rehabilitation

- ▶ Pain management.
- ▶ Improve nutritional status.
- ▶ Improve physical conditioning, endurance, and exercise performance
- ▶ improve social, cognitive, emotional, and vocational status.
- ▶ Reduce hospitalizations.
- ▶ Patient and family education and counseling

1)CHEMOTHERAPY

- Alkylating agents-cyclophosphamide
- Antimetabolites -methotrexate
- Antibiotics -bleomycin
- Hormones
- Immunosuppressives

2)RADIOTHERAPY

- ▶ The use of high-energy radiation to kill cancer cells and shrink tumors

▶ TYPES

- Teletherapy /external-beam radiation therapy
- Brachytherapy/internal-beam radiation therapy
- Combination of tele and brachytherapy

The term used to describe the dose of ionizing radiations absorbed by the tissue is "centigrays"(cGy)

3)Hormonal therapy

- ❖ Minority of tumors are sensitive to hormonal therapy - breast cancer and prostate cancer

4)Immunotherapy

- ▶ It is the newest and most promising medical strategy being investigated
- ▶ Alpha interferon is the only biological response modifier that has received approval from Food and Drug Administration for commercial use.

5)Surgical

- Surgery for metastases
- Surgery for vascular access
- Laser surgery

PT assessment

- Name
- Age , gender
- Height
- Weight
- BMI
- Diagnosis and stage
- Metastatic sites
- History of present illness
 - Previous Rx

- Current Rx
- Medications
- prior medical history
- Inspection of wound
- Assess ROM of affected region
- Assess strength of affected areas
- Evaluate posture
- Sensation of affected region
- Signs of rejection of graft/flap

- Examination
 - Cardiopulmonary system
 - HR,BP,RR
 - Heart sounds
 - Chest sounds
 - Symptoms and signs-
 - Musculoskeletal system
 - Neurological system
 - GI system
 - Skin and peripheral vascular system
 - Psychosocial examination
 - Functional and ADL

General precautions

❖ Blood counts-

- *Hemoglobin* < 7.5g :-Dyspnea even if O₂ concentration is100%.
- *Platelet count*:-
 - <10,000 : no exercise(internal bleeding)
 - 10,000-20,000: only active exercises and isometric exercises.
no resistance exercise and prolonged stretches
 - > 30,000-50,000: all exercises
- *Hematocrit*:-
 - < 25% : no aerobic exercise(dyspnea d/t anemia)
 - 25-35% : light aerobic exercise

- ❖ PFT
 - < 50-75% - light aerobic exercise
 - > 75% _ all exercises
- ❖ X-rays:-
 - spine- based on 3 column /6column model of Denis.(3 or more columns –unstable)
 - >50% cortex involved – no wt. bearing, give braces and external support.
 - >50-60% intramedullary lesion-no wt. bearing.
- ❖ Temperature >101 degrees Fahrenheit
- ❖ Heart rate >110 beats/min
- ❖ ECG changes –
 - premature ventricular contractions
 - ventricular arrhythmias
 - ischemic features : ST depression
 - No exercise should be given

Research suggests that physical exercise improves both the physical and psychological distress experienced by cancer treatment and rehabilitation.

- ▶ These benefits include :
 - Decreased fatigue
 - Improved functional capacity
 - Increased muscular strength
 - Improved self-concept
 - Decreased anxiety and depression

Physiotherapy Aims

- ▶ Reduction of post surgical edema
- ▶ Increase ROM in affected region
- ▶ Scar mobilization
- ▶ Increase strength in affected areas
- ▶ Prevent postural deviations by maintaining alignment.

Physical activity recommendations

Mode :

- Any form of aerobic exercise patient enjoy
eg.walking,light jogging etc.
- Always warm-up with gentle mobility and stretching
- Gradual cool-down once you have finished your session.
- muscle strengthening exercises - weights, push ups or squats

Frequency :

- *Stage1* :-30 minutes or more of moderate,over a week.
- *Stage 2* :-20 minutes of moderate intensity,3-5 times a wk
- Moderate intensity activity is described as that which raises the heart to around 60% of maximum heart rate (MHR=220 beats per minute – age).

Duration :

- Performing the activity for 20 to 30 minutes

Shorter bouts (5-10 minutes) accumulated throughout the day is beneficial if they find continuous 20-30 minutes difficult

Head and neck cancer

POP Day 1

- ▶ Chest expansion-deep breathing exercise
- ▶ Chest secretions-nebulization ,splinted coughing and houghing but with precautions.
- ▶ Oral hygiene-oral suctioning,betadine mouth washes or with gauze
- ▶ Ankle toe movements, heel slide

POP Day 2

- ▶ Same as day 1
- ▶ Bed side ambulation if vitals are stable

POP day 3

- ▶ Active movements of mouth and upper limb within pain limit

Depending on the following:

- 1)Bulk of flap-no excessive bulkiness or shrinkage of flap(flap failure)
- 2)Shoulder exercises started if drainage tubes removed
- 3)Donor area healing and no wound gapping
- 4)Shoulder flexion-30 to 45degrees
shoulder abduction-20 to 30 degrees
- 5)Encourage patient to talk for movements of tongue

POP DAY 4

- ▶ Symptomatic management
 - improve respiratory status
 - mobilization of patient
 - shoulder mobilization ex.
 - oral hygiene
- Jaw deviation ex. and postural correction
 - Home program
- Chin tucks
- Neck flexion
- Rotation and lateral flexion of neck
- Shoulder –pendulum ex
 - hand ex. ,finger ladder ,shoulder wheel

Complications

Head and neck cancer

- ▶ Shoulder dysfunction –
 - spinal accessory N. Trapezius paralysis shoulder depression and scapular upward rotation
- ▶ Due to Pectoralis flap – shoulder adduction affected reduced chest wall mobility d/t scar
- ▶ Speech and swallowing dysfunction
- ▶ Airway secretions
- ▶ Deconditioning
- ▶ Specific to radical neck dissection
- ▶ Facial lymphedema
- ▶ Wound infection
- ▶ Injury to cranial nerves
- ▶ Carotid injury

Breast cancer

Breast cancer complication

- ▶ Lymphedema
- ▶ Wound infection
- ▶ Frozen shoulder
- ▶ Chronic pain syndrome

- ▶ Painful lymphatic occlusion
- ▶ Axillary thrombophlebitis

Post operative PT goals

- ▶ To prevent respiratory complications
- ▶ Prevent or minimize lymphedema
- ▶ Prevent postural deformities
- ▶ Maintain ROM of involved upper limb
- ▶ Maintain or increase strength of involved shoulder
- ▶ Improve exercise tolerance

PT POP day 1-2

- ▶ Observe incision ,drainage tube ,dressing
- ▶ Examine chest expansion
- ▶ Deep breathing ex, nebulization ,FET ,oral suction
- ▶ Positioning -shoulder slightly flexed and abducted and distal aspect elevated.
- ▶ If patient can sit on 1st day then elevate the arm
- ▶ Patient should move actively the elbow and wrist and hand.
- ▶ Isometrics for shoulder till DT is removed
- ▶ Ankle toe movements , heel slides

POP day 4-5

- ▶ Postural correction-patients tend to hold arm against body with elbow in 90degrees.
- ▶ Static ex continued till DT removed
- ▶ Active shoulder movements(not beyond 90 till sutures are removed.)
- ▶ Active movements for neck , shoulder shrugging ,protraction \retraction
- ▶ Resisted ex for elbow wrist and hand

POP DAY 6-7

- ▶ Patient is usually discharged.
- ▶ Teach home program and call for follow up.
 - Continue all above exercises
 - Shoulder ex. Above 90degrees can be started
 - Patients should be taught to measure their arm girth and identify signs of infection:

Lymphedema

Swelling due to the excess accumulation of fluid in the tissues caused by inadequate lymphatic drainage.

EVALUATION

- ▶ ROM
- ▶ Strength
- ▶ Girth measurement
 - levels : axilla
 - 9'' above elbow
 - 6'' above elbow
 - 3'' above elbow
 - at elbow
 - 6'' below elbow
 - 3'' below elbow
 - wrist
 - palmar crease
 - middle finge
- ▶ Volumetry : limb placed in tub of water and water displaced is measured and compared to unaffected side
- ▶ Tonometry : used to objectively quantify tissue texture changes by measuring tissue compressibility
- ▶ Imaging :MRI,CT,USG with or without Doppler

Complex decongestive physical therapy(CDPT)

Four main parts

- 1)skin care
- 2>manual lymph drainage
- 3)compression
- 4)exercises

Skin care

❖ Do's:

Wear loose clothes, rings, bangles

Wear gloves for gardening, dish washing..

Use sunscreen

Keep skin moisturized and clean

Contact doctor-insect bites, signs of infection, cuts

❖ Don't:

Smoke with affected hand

Shave or apply deodorant on fragile skin

Carry heavy loads

Manual lymph drainage

- ▶ It is a gentle manual technique which improves the activity of the lymph vessels
- ▶ circular or spiral strokes with a pressure increase followed by a pressure decrease and then a pressure less phase .This causes a pumping effect.
- ▶ Deep pressure->compression of lymph node-release ->pressure. difference(- pressure.)->sucking of fluid
- ▶ Require more skills
- ▶ Time 1-1.5 hours
- Compression therapy
- ▶ Applied between treatments to prevent reaccumulation of evacuated fluid.
- ▶ Applied with multi-layered short stretch bandages.
- ▶ Can also be applied by pneumatic compression pumps.
 - in this the pressure should be less than diastolic pressure and pulse should be monitored.

Exercise

- ▶ Pumping effect –muscle
 - joints

Slow exercises with sufficient rest

Bilateral exercises

- Diaphragmatic breathing
- Active exercises for each joint
- Isometrics with elevation

.Vigorous ex. or high resistance ex. Avoided

Lung Cancer

Surgery:

Wedge resection or segmentectomy

Lobectomy

Pneumonectomy

Common problems

- ▶ Ineffective cough
- ▶ Decreased chest expansion
- ▶ Decreased trunk mobility
- ▶ Decreased ambulation tolerance
- ▶ Pain

Physiotherapy Management

- ▶ Deep breathing
- ▶ Pursed lip
- ▶ Segmental breathing
- ▶ Airway mx
- ▶ Lung exp therapy
- ▶ Pain relieving modalities
- ▶ Progressive ambulation
- ▶ Trunk mobility ex.
- ▶ Home prog.

Stop exercising if:

- ▶ following occur either during or
- ▶ immediately following exercise.
- an irregular pulse
- joint or bone pain
- leg pain or cramps
- chest pain
- sudden onset of nausea
- dizziness, blurred vision, fainting
- difficulty breathing, numbness or loss of sensation in hands or feet